

containing objects already partially exists and that this object is being added to the object hierarchy under a home object.

As an example of steps 200 and 201, suppose in the graphical user interface 150 in Figure 1 that the user 108 wants to create the “VOL02” volume representation 230 under the STORAGE SYSTEM A representation 231. To do so, in step 200 this embodiment creates an object (not shown) to represent the volume and in step 201, the user supplies the simple name VOL02 for the object identifier. Assume in this example that the VOLUMES representation 232 is a transparent group object that is used simply to provide visual organization to resources but that does not effect the homes of objects placed below the VOLUMES representation 232. As such, in step 201, the resource manager 121 assigns the home of the VOL02 representation 230 to be a reference (e.g., a pointer) to an object represented by the STORAGE SYSTEM A representation 231, rather than to the object represented by the VOLUMES representation 232, because the VOLUMES representation 232 is transparent.

Next, in step 202, the resource manager 121 displays at least one representation of the object on a graphical user interface (i.e., 150 Figure 1). The representation of the object includes, at a minimum, the simple name of the object which in this example is “VOL02”.

Next, in step 203, the resource manager 121 determines if a home condition exists for the representation of the object. A home condition may exist for a representation of an object, for example, if that representation of the object is to be displayed in the graphical user interface out of a home context of the object, or, if the representation of the object is to be displayed in the graphical user interface non-uniquely in a context in which the object representation is displayed. In other words, within the graphical user interface 150, if displaying the simple name of an object as a representation of the object in a graphical user interface is sufficient to uniquely identify the resource which that object representation represents, the resource manager 121 will use the simple name for display purposes without the home of the object. Alternatively however, if the user 108 viewing the graphical user interface 150 will be unable to determine a unique identity of the representation of an object from the simple name alone (e.g., there are multiple

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objects in the object hierarchy in the same context that all have the same simple name), then a home condition exists for the representation of that object which requires the resource manager 121 to display the home of the object in conjunction with the simple name on the graphical user interface 150 in order to clarify the identity of the object on
5 behalf of the user 108.

If a home condition exists in step 203, the resource manager 121 proceeds the process step 204 to be included the home of the object in the representation of the object displayed on the graphical user interface 150. In the example of the representation VOL02 230, the home (STORAGE SYSTEM A) is not displayed following the simple
10 name VOL02 since the VOL02 representation 230 is displayed in its home context (i.e., step 204 is skipped). However, notice that another representation 233 of this same volume VOL02 under the VOLUMES representation 234 (under the ALL GROUPS, OS
15 STYPE, and UNIX representations) is displayed in a fully qualified manner as “VOL02@STORAGE SYSTEM A” since this representation 233 is displayed out of its home context and furthermore, this representation 233 has a simple name “VOL02” that is the same as the simple name “VOL02” of the representation 235. Since two representations 233 and 235 have the same simple name, each is displayed in a fully qualified manner to include its home. In this manner, the operation of embodiments of
20 the invention is able to alter the representation of an object on the graphical user interface 150 to provide either the simple name of the object or to provide the object identifier in a fully qualified manner including the simple name and the home of the object, depending upon the requirements need to uniquely identify a resource represented by those representations.

If, in step 203, the resource manager 121 determines a home condition does not exist for the representation of the object, or upon completion of processing step 204, processing proceeds the step 205 in which the resource manager 121 can repeat the steps 200 through 204 for all resources in a computing system environment to create an object hierarchy and to provide a display of the hierarchy within the graphical user interface 150. As noted above however, the object hierarchy may initially exist with a minimal
30 number of objects, such as only a root object. As such, repetitive processing steps 200-

2204 can result in the creation of an entire object hierarchy to represent all resources in a computing system environment 100 by representations of objects on the graphical user interface 150.

Each representation can include either the simple name of the object or the simple name and the home of the object depending upon the context in which that representation is displayed. If the representation of the object is displayed, for example, in its home context (i.e., is displayed under the representation of the home object which is home to that object) then the simple name can be used to uniquely identify the representation of the object since that representation is displayed in a home context for that object (or is otherwise uniquely identifiable in the context in which it is to be displayed).

Alternatively, if a user or other process determines that a representation of the same object is to be contained or displayed elsewhere within the graphical user interface (e.g., in order to convey other relationships which are applicable to a resource which that representation represents), then embodiments of the invention may determine in certain instances that a home condition exists that also requires the display of the home of the object.

Briefly directing attention now back to the example graphical user interface 150 shown in Figure 1, the resource manager 121 creates and displays each representation of an object on a separate line as a character string in this example. For example, the ALL 20 STORAGE SYSTEMS representation 236 is a representation of a group object that provides a grouping mechanism to group storage system objects, which are each respectively shown by the representations STORAGE SYSTEM A through STORAGE SYSTEM N. Each storage system in the computing system environment 100 in Figure 1 is thus shown by a respective representation in the graphical user interface 150. Also in this example, under STORAGE SYSTEM A and STORAGE SYSTEM B, the resource manager 121 displays a respective VOLUMES group object representation 232, 237 in order to convey to the user 108 what volumes are located in each respective storage system. Specifically, volumes identified by the representations VOL01 through VOL03 are contained within STORAGE SYSTEM A and volumes identified by the representations VOL01 and VOL02 are contained within STORAGE SYSTEM B.